On the Organic Bodies contained in Ancient Egyptian Bricks. By Professor Unger.

The author lately obtained some tiles from the well-known brick pyramid of Dashur, the building of which dates between 3300 and 3400 years B.C. These, like all the Egyptian bricks, have been made with an addition of desert sand and chopped straw, in order to give them greater cohesion and durability. Both with the principal mass, the Nile-mud, and the chopped straw, seeds of various plants, animal remains, and artificial products were accidentally introduced into the manufacture; so that, the consistency of the enclosing substance having remained unaltered, these bodies have also been preserved unchanged to the present time, and are therefore to be recognized quite distinctly.

The investigation of these bodies, which are generally small, showed the presence, at the remote period of the building of the pyramid, of five different cultivated plants, seven field-weeds, and some local plants, together with several freshwater Mollusca and remains of fishes and insects, &c., but all organisms which still for the most part occur in Egypt, and have hitherto remained unaltered.

Besides two cereals (wheat and barley), there were found the teff (*Eragrostis habyssinica*), the field-pea (*Pisum arvense*), and the flax (*Linum usitatissimum*); the last was, in all probability, employed both as a food-plant and for textile purposes.

Greater interest attaches to the weeds, which belong to the commonest kinds, and have necessarily migrated with the cultivated plants, not only over all Europe, but over the greater part of the earth. Among them may be named *Rhaphanus Rhaphanistrum, Chrysanthemum segetum, Euphorbia helioscopia, Chenopodium murale, Bupleurum aristatum,* and *Vicia sativa.*

Of artificial products, there were found fragments of burnt bricks and earthen vessels, a small piece of linen thread and one of woollen thread—all of which indicate a tolerably advanced civilization at the time of the building of this pyramid. Moreover the condition in which all these enclosed objects, especially the chopped straw, occurred, proves that brick-making was really carried on in the manner stated by Herodotus and described in Exodus v. 11.

The author expresses a hope that a continued investigation of this material will furnish much important information as to the commencement of civilization in Egypt, and that the dumb and sealed-up bricks of Nile-mud will tell us many things that we seek in vain in the old buildings and sarcophagi, to say nothing of written records. —*Anzeigen der Akad. der Wiss. in Wien, math-naturw. Classe,* June 14, 1866, pp. 141, 142.

Interchange of Birds between America and Europe.

In a memoir presented by Mr. Spencer F. Baird to the National Academy of Sciences, "On the Distribution and Migrations of North American Birds," an abstract of which is published in Silliman's Journal for January, March, and May of this year, the author de-

duces the following generalizations in regard to the interchange of birds between America and Europe.

European birds, especially the land species, reach Greenland and return to the continent by way of Iceland, the Faroe Islands forming a stepping-stone from Great Britain and Scandinavia. In very rare instances species seem to proceed direct to Greenland, without stopping in Iceland, although this may be due to the fact that while visiting Iceland they have not yet been noted there by any naturalist.

The European birds found on the continent of North America reach it by autumnal movement from Greenland in company with strictly North American species.

Birds of North America rarely, if ever, reach England from Greenland by direct spontaneous migration by way of Iceland, as shown by the fact that only three of the American birds occurring in Greenland are found in Iceland, and that few of the American species observed in Europe are found in Greenland at all.

Most specimens of American birds recorded as found in Europe were taken in England (about fifty out of sixty-nine), some of them in Heligoland; very few on the continent (land birds in only five instances).

In nearly all cases these specimens belonged to species abundant during summer in New England and the eastern provinces of British America.

In a great majority of cases the occurrence of American birds in England, Heligoland, and the Bermudas has been in the autumnal months.

The clue to these peculiarities attending the interchange of species of the two continents will be found in the study of the laws of the winds of the northern hemisphere, as developed by Prof. Henry and Prof. Coffin. These gentlemen have shown (see Prof. Henry's articles on Meteorology, 'Report of Commissioner of Patents for 1856,' p. 489) that the "resultant motion of the surface atmosphere, between latitudes 32° and 58° in North America, is from the west, the belt being twenty degrees wide, and its greatest intensity in the latitude of 45°. This, however, must oscillate north and south, at different seasons of the year, with the varying declination of the sun. South of this belt, in Georgia, Louisiana, &c., the country is influenced, at certain seasons of the year, by the north-east trade-winds, and north of the same belt by the polar winds, which, on account of the rotation of the earth, tend to take a direction towards the west. It must be recollected that the westerly direction of the belt here spoken of is principally the resultant of the south-westerly and north-westerly winds alternately predominating during the year."

From these considerations and facts, therefore, we are entitled to conclude that the transfer of American birds to Europe is principally, if not entirely, by the agency of the winds, in seizing them during the period of their migration (the autumnal especially), when they follow the coast or cross its curves, often at a considerable distance from land, or a great height above it. Carried off, away out to sea,

mainly from about the latitude of 45° (the line of greatest intensity of the winds), the first land they can make is that of England, whence the fact that most of the species have occurred in the British islands, as well as Heligoland, equally well fitted to attract stragglers and furnish them a resting-place. It is probable that, apart from their few permanent residents, the Bermudas are supplied in the same manner.

Iceland being in the latitude of the reverse current, from east to west, such of its species as are caught up by the winds and carried off would soon reach Greenland, only a few hundred miles distant. This may be the principal agency of supply from Europe to Greenland, as most European land birds are only met with there at rare intervals; although, as Greenland lies north of Iceland, there may be a regular migration to some extent.

As remarked, the prevailing direction of the winds, whether violent or moderate, throughout the year as well as during the period in which our birds are on either their spring or autumnal migration, is from America towards Europe. Even should their direction be reversed, and that rare phenomenon, a summer "north-easter," occur, it would merely have the effect of bringing the birds back upon our own coast, or into the interior, the line of the storm being, in fact, about parallel with the eastern shore line of the United States, and its influence extending only a short distance from the coast, and not involving the vicinity of Europe at all. That such storms do affect the movements of our birds is shown in the case of the golden plover. It is well known that this species breeds in immense numbers in the northern regions of America, and that the southward migration, in summer or autumn, is principally confined to the region along or near the Atlantic coast. Generally large flights would seem to start directly from Newfoundland and Nova Scotia for the West Indies, where they are met with every autumn passing still southward into South America, and reaching almost to Patagonia. Usually it is but a comparatively small number that touch and rest along the Atlantic states; but it is well known to the sportsmen of New England that, should a violent north-east storm occur off the coast towards the end of August, unusual flights of plover and curlew may be looked for*. This was the case in 1863, when the islands of Nantucket, Martha's Vineyard, and other localities along the coast of Massachusetts swarmed with incredible flights of these birds. On similar occasions immense numbers have been carried far into the interior of the Atlantic states, furnishing the occasion of a regular carnival for gunners, much as in the case of great flights of the wild pigeon.

Another instance of the influence of north-east storms is in the occurrence of the Stormy Petrel (Mother Carey's Chickens) and other oceanic birds far in the interior, and even across the Alleghanies, during and after such storms. The collections of the Smith-

* Mr. G. N. Lawrence mentions (Annals New York Lyceum, 1864, viii. 100) that the golden plover is always found at Montauk Point on the 28th of August, should a north-east storm occur.

sonian Institution embrace specimens of *Thalassidroma Leachii* killed about Washington in August 1842, with hundreds of others. I myself obtained at Harrisburgh, Penn., a fine adult Pomarine Skua (*Cataractes pomarinus*), killed on the Susquehanna, near that city, in September 1839. Adults of the species mentioned are rarely seen within the limits of the United States at all, and in summer the latter would hardly be likely to occur south of Newfoundland.

The present is not the occasion to discuss the nature of that impulse which causes the bird or the fish to retrace its steps in spring so unerringly; the fact is a well-established one, and of much importance in reference to the multiplication or diminution of species. A region deprived of its spring birds or fishes by extermination will only be filled up again in the course of a long period of time. The result, however, can be greatly accelerated by artificial propagation in the places to be supplied.

It may be considered established that the migrations of birds are generally more or less in a north and south direction, influenced very materially by river-courses, mountain-chains, forests, conditions of moisture, mean temperature, altitude, &c. Middendorf (Die Isepiptesen Russlands) suggests that birds migrate in the direction of the magnetic pole—a suggestion not at all borne out by the facts in North America.

It may be further remarked that while birds proceed generally in the spring to the very spot of birth, and by a definite route, their return in autumn is not necessarily in the same line. Many birds are familiar visitors in abundance, in certain localities, in either spring or autumn, and are not known there in the other season. This is a fact well known to the diligent collector; and I have been inclined to think that, in very many instances, birds proceed northward along the valley of the Mississippi, to return along the coast of the Atlantic.

In general the northward vernal movement is performed much more rapidly, and with fewer stops by the way, than the autumnal.

Birds generally make their appearance in given localities with wonderful regularity in the spring, the *Sylvicolidæ* especially—a difference of a few days in successive years attracting the notice of the careful observer; this difference is generally influenced by the season. The time of autumnal return is perhaps less definite.

Observations on the Microscopic Shell-structure of Spirifer cuspidatus, *Sow., and some similar Forms.* By F. B. Meek.

Mr. Meek shows in a paper in Proc. Acad. Nat. Sc. Philad. 1865, p. 275, that the shell of the *Spirifer cuspidatus*, both of American specimens referred to this species, or closely related, and of an Irish specimen of this species received from Mr. Davidson, is clearly punctate, contrary to the decision of Dr. Carpenter. He then asks the question whether two types—a punctate having the internal characters of *Syringothyris*, and an impunctate—may not be included under the species, and suggests the importance of observations with reference to this question.—Silliman's *American Journal*, May 1866.